

ANALYSIS OF AEROSOL SIZE DISTRIBUTION DURING SAHARAN DUST EVENTS AT MT. CIMONE (ITALY)

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Background and Aims: There is a growing concern about the health effects of Saharan dust outbreaks but exposure characterization needs to be largely improved both from a physical and chemical point of view. In this work, we investigated the typical aerosol size distribution observed during Saharan dust outbreaks over Northern Italy.

Methods: Saharan dust outbreaks over North Italy were identified by analysing the hourly number concentration of coarse aerosol particles (geometric particle diameter, $D_p > 1 \mu\text{m}$) observed at the Italian Climate Observatory "O. Vittori" at Mt. Cimone (2165 m a.s.l., Italian Northern Apennines), a global GAW station representative for a wide area extending over South Europe/Mediterranean basin. Here, the coarse aerosol particle are considered a marker of mineral dust transported. These measurements were carried out using a optical particle counter (model 1.109; Grimm, Ainring, Germany) following the experimental protocol described by Marinoni et al.(2008). In order to clearly deduce the Saharan origin of coarse particle peak events, 3D air mass back-trajectories from Mt. Cimone were calculated using the FLEXTRA model. Following Bonasoni et al. (2004), in order to corroborate the Saharan dust event identification, the classification procedure involves satellite data and transport modelling analyses.

Results: We found that Saharan dust outbreaks brought pronounced changes in the aerosol size distribution observed at Mt. Cimone.

Conclusions: Our results suggest that Saharan dust outbreaks can influence aerosol concentration from the accumulation to the coarse mode. Further work should be carried out to clarify the relationship between observed mineral dust size distribution, typical atmospheric transport patterns as well as evolution in time and space of the mineral dust plumes along the transport from North Africa to North Italy.

References:

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